

ANNALS OF THE SOUTH AFRICAN MUSEUM  
ANNALE VAN DIE SUID-AFRIKAANSE MUSEUM

Volume 86 Band  
October 1981 Oktober  
Part 3 Deel



DINOCEPHALIA TYPE MATERIAL  
IN THE SOUTH AFRICAN MUSEUM  
(REPTILIA, THERAPSIDA)

By

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Cape Town    Kaapstad

The ANNALS OF THE SOUTH AFRICAN MUSEUM

are issued in parts at irregular intervals as material  
becomes available

Obtainable from the South African Museum, P.O. Box 61, Cape Town 8000

Die ANNALE VAN DIE SUID-AFRIKAANSE MUSEUM

word uitgegee in dele op ongereelde tye na gelang van die  
beskikbaarheid van stof

Verkrygbaar van die Suid-Afrikaanse Museum, Posbus 61, Kaapstad 8000

OUT OF PRINT/UIT DRUK

1, 2(1-3, 5-8), 3(1-2, 4-5, 8, t.-p.i.), 5(1-3, 5, 7-9),  
6(1, t.-p.i.), 7(1-4), 8, 9(1-2, 7), 10(1-3),  
11(1-2, 5, 7, t.-p.i.), 15(4-5), 24(2), 27, 31(1-3), 32(5), 33, 45(1)

EDITOR/REDAKTRISE

Ione Rudner

Copyright enquiries to the South African Museum

Kopieregnavrae aan die Suid-Afrikaanse Museum

ISBN 0 86813 020 6

Printed in South Africa by  
The Rustica Press, Pty., Ltd.,  
Court Road, Wynberg, Cape

In Suid-Afrika gedruk deur  
Die Rustica-pers, Edms., Bpk.,  
Courtweg, Wynberg, Kaap



# DINOCEPHALIA TYPE MATERIAL IN THE SOUTH AFRICAN MUSEUM (REPTILIA, THERAPSIDA)

By

J.A. VAN DEN HEEVER\*

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F.E. GRINE

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[MS accepted 14 May 1981]

## ABSTRACT

Brief statements on the preservation of the dinocephalian type specimens, the localities from which they were recovered, and the collectors responsible are given. The original generic and/or specific diagnoses are reproduced. All relevant references to each specimen are listed, together with pertinent comments.

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## INTRODUCTION

The infra-order Dinocephalia (assuming that this group is monophyletic) represents a Middle Permian radiation of carnivorous and herbivorous therapsids. In the *Tapinocephalus* Zone (Kitching 1977) sediments of the Beaufort Group, Cape Province, South Africa, the dinocephalians form a substantial part of the dominant therapsid fauna. It is commonly held that the South African dinocephalians are derived from earlier Russian therapsids (Olson 1962; Boonstra 1969; Tatarinov 1974, 1976).

Since the South African Museum houses the largest collection of dinocephalian type specimens, it was felt that a comprehensive list of this material would serve a useful purpose. The collection contains some forty-four holotype

\* The order of authorship was decided by the flip of a coin.

and paratype specimens and, in order to present this list of material in a clear manner, Boonstra's (1969) familial and subfamilial classifications have been utilized.

The generic and specific diagnoses included in this paper are taken from the original diagnosis of each taxon. Those that have been indicated clearly as diagnoses are reproduced verbatim. In some instances, where the taxonomic diagnosis was not clearly separated from the descriptive text, the present authors have scrutinized the description in order to determine which features were considered by the original author to be diagnostic. However, in all cases the terminology remains that of the original author.

Most of the localities are represented by farm names, spelt in a variety of ways by different workers. In order to avoid confusion, the authors have followed Kitching (1977) in the spelling of locality names.

## TYPE MATERIAL

### Family *Anteosauridae*

*Anteosaurus abeli* Boonstra, 1952

#### *Holotype*

SAM-11296

#### *Material*

Fairly complete skull and lower jaw which have been distorted slightly by shear.

#### *Locality*

Kruisrivier, Sutherland.

#### *Collected*

Boonstra and Laurenson, 1937.

#### *Generic diagnosis*

See Watson (1921) for diagnosis of *Anteosaurus*.

#### *Specific diagnosis*

Skull large and massive; postorbital boss less massive than in genotype [*sic*]; jugal boss low to very prominent; bone thickened around pineal foramen but does not form a clear, circular boss; frontals strongly swollen; tooth-bearing palatine boss semilunate; premaxillary edge slopes upward in contrast to genotype [*sic*]; incisors very long with only some showing slight indication of lingual step; premaxillae greatly swollen dorsally and clearly demarcated from maxillae; squamosal moderately flared laterally; dentary strong and very massive (after Boonstra 1952e: 150).

*References*

- Boonstra 1948: 40 (fig.).  
Boonstra 1952e: 150–151.  
Boonstra 1953a: 26, pl. 1.  
Boonstra 1954a: 109, 112–114, 124–125, 144, figs 1–2.  
Haughton & Brink 1955: 42.  
Piveteau 1961a: 84, fig. 11.

*Comments*

Boonstra (1969) regarded *Anteosaurus abeli* as a junior synonym of *Anteosaurus magnificus*.

*Paratype*

SAM-340

*Material*

Good skull and part of lower jaw which have been distorted by shear.

*Locality*

Leeurivier, Beaufort West.

*Collected*

Haughton, 1916.

*References*

- Boonstra 1952e: 150.  
Boonstra 1953a: pl. 3.  
Boonstra 1954a: 108, 112–113, 124, 130, 144, fig. 6.

*Comments*

An isolated symphysis labelled SAM-4340 does not belong to this individual. There are several unlabelled fragments associated with the specimen which do not appear to belong to it.

*Paratype*

SAM-5621

*Material*

Incomplete, fragmentary skull consisting of part of snout and a portion of cranial roof.

*Locality*

Leeurivier, Beaufort West.

*Collected*

Haughton, 1916.

*References*

Boonstra 1952e: 150.

Boonstra 1954a: 108, 131, 144.

*Paratype*

SAM-9123

*Material*

Weathered and sectioned skull lacking lower jaw; two vertebrae.

*Locality*

Voëlfontein, Prince Albert.

*Collected*

Boonstra, 1929.

*References*

Boonstra 1952e: 150.

Boonstra 1954a: 108, 131, 144.

Boonstra 1962: 97-98; fig. 33.

*Paratype*

SAM-11302

*Material*

Fairly complete but weathered skull with part of lower jaw.

*Locality*

Buffelsvlei, Beaufort West.

*Collected*

Boonstra, 1938.

*References*

Boonstra 1952e: 150.

Boonstra 1954a: 134-135, 144.

*Comments*

Boonstra (1954a) placed this specimen in the hypodigm of *Anteosaurus crassifrons*.

***Paratype***

SAM-11929

***Material***

Imperfect, weathered skull.

***Locality***

See comments.

***Collected***

See comments.

***References***

Boonstra 1952*e*: 150.

Boonstra 1954*a*: 109, 135, 144.

***Comments***

The locality is questionable. In the museum catalogue it is given as 'unknown, probably near Abrahamskraal, Prince Albert'. Boonstra (1954*a*: 109) gave the locality as Kruisvlei, Beaufort West, but later in the same paper he (1954*a*: 135) referred to the locality as Abrahamskraal, Prince Albert. The museum catalogue records the collector as 'unknown'; Boonstra (1954*a*: 109) stated that he collected it. Boonstra (1954*a*) placed this specimen in the hypodigm of *Anteosaurus crassifrons*.

*Anteosaurus acutirostris* Boonstra, 1954

***Holotype***

SAM-9329

***Material***

Nearly complete skull and lower jaw.

***Locality***

Kruisvlei, Beaufort West.

***Collected***

Boonstra, 1929.

***Generic diagnosis***

See Watson (1921) for diagnosis of *Anteosaurus*.

***Specific diagnosis***

Skull large, maximum length of 675 mm. Snout long, high, narrow, and light. Intersquamosal width great (480? mm). Postfrontal boss huge and pro-

minent. Jugal boss massive, angular boss massive. Fronto-naso-prefrontal swelling very strong with distinct step on to the anterior nasal surface and laterally slightly overhanging the sides of the skull. Pineal boss low with rounded edges extending to the occipital edge. Fairly strong upward inclination of premaxillary edge. Occiput high, fairly wide, very deeply concave with sharp and great posterior sweep of temporal arches; upper part of temporal fossa roomy anteroposteriorly. Temporal arch rises above plane of intertemporal surface. Palate apparently long and narrow. Basis cranii fairly long. Exoccipitals fused with basioccipital to form rounded condyle, which is visible beyond occipital edge in dorsal view. On both sides 4 upper and 4 lower incisors, 1 canine, 5? postcanines. (After Boonstra 1954a: 131–132.)

### *References*

- Boonstra 1952e: 150.  
Boonstra 1953a: pl. 2.  
Boonstra 1954a: 108, 113, 131–133, 144, fig. 10.  
Haughton & Brink 1955: 42.

### *Comments*

Boonstra (1969) regarded *Anteosaurus acutirostris* as a junior synonym of *Anteosaurus magnificus*.

*Anteosaurus crassifrons* Boonstra, 1954

### *Holotype*

SAM-11946

### *Material*

Good skull distorted by shear.

### *Locality*

Buffelsvlei, Beaufort West.

### *Collected*

Boonstra and Marais, 1951.

### *Generic diagnosis*

See Watson (1921) for diagnosis of *Anteosaurus*.

### *Specific diagnosis*

Skull large but short and squat; maximum length 570 mm. Snout short, high and very wide. Intersquamosal width fairly small (330? mm). Postfrontal boss fairly massive and prominent. Jugal boss massive. Fronto-naso-prefrontal swelling very massive with very distinct step on to anterior nasal surface and



laterally strongly overhanging sides of skull. Pineal boss rounded, large and extending on to frontal. Very sharp inclination of premaxillary edge. Occiput high, fairly wide, deeply concave, with great posterior sweep of temporal arches. Upper part of temporal fossa roomy in anteroposterior direction. Temporal arch not rising above plane of intertemporal surface. Palate very short with massive lateral pterygoid flanges. Basis cranii short, with short basisphenoid. Exoccipitals fused with basi-occipital to form rounded condyle. In both premaxillae teeth not preserved but five matrix-filled alveoli shown; in both maxillae five postcanine roots of greatly varying diameter preserved, numbers 2 and 5 much smaller than other three. (After Boonstra 1954a: 133–134.)

#### References

- Boonstra 1954a: 109, 113, 133–134, 144, figs 11–13.  
Haughton & Brink 1955: 42.

#### Comments

Boonstra (1969) regarded *Anteosaurus crassifrons* as a junior synonym of *Anteosaurus magnificus*.

*Anteosaurus cruentus* Boonstra, 1954

#### Holotype

SAM-11694

#### Material

Reasonably complete skull without lower jaw.

#### Locality

Koringplaas, Laingsburg.

#### Collected

Boonstra and Du Plessis, 1946.

#### Generic diagnosis

See Watson (1921) for diagnosis of *Anteosaurus*.

#### Specific Diagnosis

Skull moderately large, maximum length 565 mm. Snout long, narrow and fairly low. Intersquamosal width not great (360 mm). Postfrontal boss fairly strong and prominent. No jugal boss. Fronto-naso-prefrontal swelling small, passing evenly on to anterior nasal surface. Pineal boss prominent, with sharp circular border, situated very near occipital edge. Sharp upward inclination of premaxillary edge. Occiput high and fairly broad, very deeply concave with

great posterior sweep of temporal arch. Upper part of temporal fossa roomy anteroposteriorly; temporal arch not rising above very narrow intertemporal surface. Palate long, with fairly robust lateral pterygoidal flanges. Basis cranii long, but basisphenoid short. Exoccipitals form large part of dorsolateral corners of condyle. Alveolar face of premaxilla shows matrix-filled groove divided in its posterior part by distinct alveoli; appears to have been room for 5 incisors when fully developed. On right side canine root followed by roots of 6 postcanines, but on left only 4 roots with a possible fifth visible. (After Boonstra 1954a: 139–140.)

#### *References*

Boonstra 1953a: 26, pl. 6.

Boonstra 1954a: 109, 112, 114, 124, 139–141, 144, figs 17–20.

Haughton & Brink 1955: 42.

#### *Comments*

Boonstra (1953a) referred this specimen to *A. minor*. Boonstra (1969) regarded *Anteosaurus cruentus* as a junior synonym of *A. magnificus*.

*Anteosaurus levops* Boonstra, 1954

#### *Holotype*

SAM-11492

#### *Material*

Badly weathered, incomplete skull without lower jaw.

#### *Locality*

Mynhardtskraal, Beaufort West.

#### *Collected*

Boonstra and Bothma, 1940.

#### *Generic diagnosis*

See Watson (1921) for diagnosis of *Anteosaurus*.

#### *Specific diagnosis*

Skull fairly small, maximum length 485 mm. Snout fairly short, lightly built, narrow and low. Intersquamosal width relatively large (415 mm). Post-frontal boss strong and prominent. No jugal boss. Fronto-naso-prefrontal swelling strong, with distinct step on to anterior nasal surface and laterally slightly overhanging sides of skull. Pineal boss apparently prominent, reaching occipital edge. Upward inclination of premaxillary edge moderate. Occipital fairly low and broad, deeply concave, not vertical; strong posterolateral sweep



of temporal arches. Upper part of temporal fossa shortened in anteroposterior direction; temporal arch rising above plane of narrow intertemporal surface. Palate long and narrow. Basis cranii fairly short. In right premaxilla parts of crowns of 3 incisors preserved, but on left there is a matrix-filled groove with no sign of teeth. (After Boonstra 1954a: 141–142.)

#### *References*

- Boonstra 1953a: 26.  
Boonstra 1954a: 109, 141–142, 144, fig. 21.  
Haughton & Brink 1955: 43.

#### *Comments*

Boonstra (1953a) considered this skull to be a referred specimen of *A. minor*. Boonstra (1969) regarded *A. Levops* as a junior synonym of *A. magnificus*.

*Anteosaurus laticeps* Boonstra 1954

#### *Holotype*

SAM-11592

#### *Material*

Incomplete skull with only ventral and occipital surfaces preserved.

#### *Locality*

Dikbome, Laingsburg.

#### *Collected*

Boonstra and Du Plessis, 1942.

#### *Generic diagnosis*

See Watson (1921) for diagnosis of *Anteosaurus*.

#### *Specific diagnosis*

Skull large, maximum length 645? mm. Snout short and very broad. Intersquamosal width great (522 mm). Occiput low and very broad, shallowly concave; sweep of temporal arches mostly lateral. Palate long and very broad with only moderately strong lateral pterygoidal flanges. Basis cranii short, with very short basisphenoid. Exoccipitals form much of dorsolateral corners of condyle. Canines very strong and slightly recurved. In right maxilla, stumps of 5 postcanines can be made out whereas on left 5 teeth are preserved with the probability of another 2, making a total of 7. Postcanines bluntly conical, but linguolabially compressed with crowns thus oval in cross-section (16 x 11 x 7 mm). (After Boonstra 1954a: 138–139.)

*References*

- Boonstra 1952e: 150.  
Boonstra 1953a: 22.  
Boonstra 1954a: 109, 138–139, 144, fig. 16.  
Haughton & Brink 1955: 42.

*Comments*

Boonstra (1952e) made this specimen a paratype of *A. abeli*. Later he (1953a) appears to infer that he considers it to be a specimen of *Jonkeria* sp. Boonstra (1969) regarded *A. laticeps* as a junior synonym of *A. magnificus*.

*Anteosaurus major* Boonstra, 1954

*Holotype*

SAM-11293

*Material*

Good skull, dorsoventrally compressed, lacking snout.

*Locality*

Boesmansrivier, Beaufort West.

*Collected*

Boonstra, 1937.

*Generic diagnosis*

See Watson (1921) for diagnosis of *Anteosaurus*.

*Specific diagnosis*

Skull very large, maximum length 805? mm. Snout long, fairly broad and high. Intersquamosal width very great (612 mm). Postfrontal boss only moderately strong and not very prominent, with postorbital forming posterolateral part. Low and weak jugal boss. Fronto-naso-prefrontal boss moderate, confluent with anterior nasal surface. Pineal boss low, with rounded edges, situated some distance from occipital edge. Occiput low and broad, moderately deeply concave. Sweep of temporal arches more lateral than posterior and upper part of temporal fossa roomy anteroposteriorly. Temporal arch rises above level of intertemporal surface. Palate fairly long and broad, with strong and deep lateral pterygoidal flanges but not so massive as in *A. crassifrons*. Basis cranii long and basisphenoid much longer than in any of the other species. Exoccipitals from dorsolateral corners of condyle. (After Boonstra 1954a: 136–138.)

*References*

- Boonstra 1952e: 150.  
Boonstra 1953a: pls 4–5.

Boonstra 1954a: 109, 120, 136–138, 144, figs 14–15.  
Haughton & Brink 1955: 42.

*Comments*

Boonstra (1952e) referred to this specimen as a paratype of *A. abeli*.  
Boonstra (1969) synonymized this taxon with *Anteosaurus magnificus*.

*Micranteosaurus parvus* Boonstra, 1954

***Holotype***

SAM-4323

*Material*

Anterior part of snout, lower jaw, manus, pes, femur, fibula, proximal part of humerus, radius, coracoid, caudal vertebra.

*Locality*

Merweville commonage, Beaufort West.

*Collected*

Haughton, 1917.

*Generic diagnosis*

Anteosaurid of very small size (after Boonstra 1954b: 156).

*Specific diagnosis*

As for genus.

*References*

- Boonstra 1954b: 149–156, figs 1–4, pl. 18.  
Boonstra 1955b: 200, 320–321.  
Haughton & Brink 1955: 45.  
Von Huene 1956: 287.  
Piveteau 1961a: 85.  
Orlov 1964: 254.  
Boonstra 1966: 14, 17–18, 23–25, figs 3, 10.  
Boonstra 1969: 33.

*Comments*

Boonstra (1969) regarded this specimen as a juvenile *Anteosaurus magnificus*.

*Paranteosaurus primus* Boonstra, 1954

***Holotype***

SAM-11485

*Material*

Partial, fragmented skull, proximal end of femur, vertebrae.

*Locality*

Mynhardtskraal, Beaufort West.

*Collected*

Boonstra, 1940.

*Generic diagnosis*

'A medium-sized Anteosaurid [*sic*] (max. length probably about 570 mm), with small postfrontal not extending posteriorly, lightly built postorbital bar, without any sign of a boss-like development in the upper part of the postorbital bar, dental formula I.3?-4?, C.1, P.C.5' (Boonstra 1954c: 159).

*Specific diagnosis*

As for genus.

*References*

- Boonstra 1952e: 150.  
Boonstra 1954c: 157-159.  
Boonstra 1955b: 320, fig. 102e.  
Haughton & Brink 1955: 45.  
Piveteau 1961a: 85.  
Boonstra 1963a: 177, fig. 8G.  
Boonstra 1963b: 200, fig. 4A.  
Orlov 1964: 254.  
Boonstra 1969: 33, 35, 55.

*Eccasaurus priscus* Broom, 1909

*Holotype*

SAM-915

*Material*

Humerus, two imperfect femora, fibula, distal end of tibia, occipital fragment, tooth, nine weathered vertebrae, rib fragments, nine additional badly preserved fragments.

*Locality*

Sandvlakte, Prince Albert.

*Collected*

Presented by Cairncross.

*Generic diagnosis*

Humerus with well-developed deltopectoral ridge which does not continue to head (after Broom 1909a: 276).

*Specific diagnosis*

As for genus.

*References*

- Broom 1909a: 276–277.  
Gregory 1926: 235.  
Broom 1932: 45, fig. 3c-d.  
Boonstra 1955b: 188, 321–322, figs 105–106, 107a.  
Haughton & Brink 1955: 47.  
Romer 1966: 373.  
Boonstra 1969: 33.

*Comments*

Broom (1909a) considered the humerus to be most similar to that of *Procolophon*, but felt *Eccasaurus* to be a primitive diaptosaurian which ‘probably belongs to a new suborder’. In 1932 he expressed the opinion that *Eccasaurus* is undoubtedly a tapinocephaloid and noted that its humerus resembles, in both morphology and size, that of *Moschops*. Boonstra (1955b) considered *Eccasaurus* to be an anteosaurid, while Romer (1966) placed the genus in the family Tapinocephalidae. Boonstra (1969) regarded the taxon to be determinable only to family.

Family **Titanosuchidae**

*Archaeosuchus cairncrossi* Broom, 1905

*Holotype*

SAM-916

*Material*

Maxilla, weathered and incomplete (side questionable).

*Locality*

Sandvlakte, Prince Albert.

*Collected*

Cairncross.

*Generic diagnosis*

Broom (1905) did not give a diagnosis but commented that the canine looked titanosuchian. Broom (1932: 18) stated that: ‘The canine is remarkable

in having a posterior ledge. The molars are relatively small, short conical teeth.'

*Specific diagnosis*

As for genus.

*References*

- Broom 1905: 333–335.  
 Broom 1909*b*: 287.  
 Broom 1932: 18, fig. 3J.  
 Boonstra 1953*a*: 28.  
 Haughton & Brink 1955: 46.

*Comments*

Broom (1905) provisionally placed this taxon in the Therocephalia, but in 1909 he put it in the Dinocephalia. Broom (1932) commented that it was perhaps representative of a 'pre-dinocephalian group'. Boonstra (1953*a*) transferred this specimen to *Titanosuchus* and questioned its specific validity. Boonstra (1969) noted that the specimen was so poor that it must be regarded as a *nomen dubium*.

*Dinosphageus haughtoni* Broom, 1929

*Holotype*

SAM-4343

*Material*

Humeri, ilia, good skull without lower jaw, scapula, cleithrum, ulna, ischium, femur, ?fibula, coracoids and vertebrae.

*Locality*

Welgemoed, Leeu-Gamka, Prince Albert.

*Collected*

Haughton, 1916.

*Generic diagnosis*

Vomers form marked median ridge on their posterior two-thirds. Pterygoids project much less downward than in *Jonkeria*. Upper half of humerus little more in plane of lower half than is the case in humerus of *Jonkeria* and, as a result, on side view the deltopectoral crest appears smaller, but this may be due to crushing. Upper portion of ilium relatively smaller than in *Jonkeria*. (After Broom 1929: 31.)

*Specific diagnosis*

As for genus.



*References*

- Broom 1929: 31, figs 17–19.  
Broom 1932: 29, fig. 7D.  
Boonstra 1953a: 27.  
Boonstra 1955b: 189, 287–293, figs 75–80.  
Haughton & Brink 1955: 44.  
Boonstra 1962: 78–80, fig. 18.  
Boonstra 1965b: 263, fig. 9.  
Boonstra 1969: 37.

*Comments*

Broom (1932) emended the diagnosis. Boonstra (1953a) transferred the species to *Jonkeria*. No mention is made in the literature of vertebrae belonging to the specimen but several vertebrae were found bearing the number SAM-4343 and probably belong to the specimen.

*Jonkeria koupensis* Boonstra, 1955

*Holotype*

SAM-9004

*Material*

Pelvis lacking ischia; distal two-thirds of ulna.

*Locality*

Klein Koedoeskop, Beaufort West.

*Collected*

Boonstra, 1929

*Generic diagnosis*

See Van Hoepen (1916) for diagnosis of *Jonkeria*.

*Specific diagnosis*

Pubo-ischiadic plate probably short (83 per cent of height as reconstructed); supra-acetabular part of ilium high (264 mm) and anteroposterior length of iliac blade very short (282 mm), so that height is 93 per cent of length; anterior iliac process fairly short, but appears shorter than it really is because of strong anterolateral eversion and it is fairly high; posterior process short and fairly low, with posteroventral edge moderately strongly folded over to form a fairly strong iliofibularis ridge on outer face; this ridge is directed obliquely upward, with its upper end not strongly bulbously thickened; a slight groove on the inner face of the everted anterior iliac process indicates attachment of rib anterior to main sacral rib; anteroposteriorly the outer face of iliac blade deeply

concave. Anteroventral edge of pubis strongly everted, with tuberculum pubis confluent with thickened part of anteroventral edge, which stretches to median line where the pubes meet but do not form a real symphysis. Ulna massive with dorsal lip of sigmoid face developed into massive swelling in its pre-axial part. (After Boonstra 1955*b*: 301.)

#### *References*

Boonstra 1955*b*: 301, fig. 87.

Boonstra 1969: 38.

*Jonkeria parva* Boonstra, 1955

#### *Holotype*

SAM-9149

#### *Material*

Well-preserved right humerus.

#### *Locality*

Saairivier, Prince Albert.

#### *Collected*

Boonstra, 1929.

#### *Generic diagnosis*

See Van Hoepen (1916) for diagnosis of *Jonkeria*.

#### *Specific diagnosis*

Smallest *Jonkeria* humerus known; length only 312 mm, but it is a very massive element with both proximal (222 mm) and distal (252 mm) ends very greatly expanded; shaft very short and bone greatly constricted in waist; diameters of shaft 84 x 78 mm; deltopectoral crest fairly short and terminates very far proximal of the plane in which entepicondylar foramen lies; it has a very massive ventral edge, and terminates as a very thick knob. Caput weak and its face strap-like, but it forms the most proximal part of the bone; processus lateralis lies more distal than the caput; processus medialis, as in all *Jonkerias* [*sic*], lies well distal of caput; capitellum very massive and extends very far proximally along ventral face, with its proximal border lying in a plane proximal to that in which the entepicondylar foramen lies; posterior to capitellum there is a deep groove in which the coronoid process moved when the ulna was flexed; twist of shaft great (30°); lateromedial line distinct with large, mound-like muscle scar on dorsal surface of shaft; anterior dorsoventral line very strong and forms prominent ridge; entepicondyle strongly developed to form a greatly outflaring, thick sheet of bone; ventral opening of entepicon-



dylar foramen oval and lies well postaxially, near edge of bone; ectepicondyle developed as a greatly flaring thin sheet of bone penetrated in its thinner part near edge by small, round ectepicondylar foramen. (After Boonstra 1955b: 303.)

#### *References*

- Boonstra 1955b: 192, 303, fig. 89.  
Boonstra 1969: 38.

*Jonkeria rossouwi* Boonstra, 1955

#### *Holotype*

SAM-5014

#### *Material*

Left scapula, incomplete precoracoid and coracoid, imperfect interclavicle, left humerus, left ulna, left radius, right ilium, left femur, left tibia, left fibula.

#### *Locality*

Abrahamskraal, Prince Albert.

#### *Collected*

Haughton per Van der Byl.

#### *Generic diagnosis*

See Van Hoepen (1916) for diagnosis of *Jonkeria*.

#### *Specific diagnosis*

Pectoral girdle fairly large and fairly massive; scapula fairly low (height 552 mm) and upper part of blade greatly expanded (width 324 mm), tricipital bulge very prominent, supraglenoidal edge forms strong raised rim; internal opening of supracoracoid foramen opens into deep subscapular groove; glenoidal facet of scapula faces ventroposteriorly but not externally; precoracoid long but low, foramen pierces bone very obliquely. Coracoid small but massive, with large glenoidal facet facing well externally.

Interclavicle massive but short (480? mm) with stem wide posteriorly and with a narrowed waist anteriorly; anterior spatulate end curves upwards very sharply and has deep groove on outer anterolateral face for reception of posteroventral edge of clavicle; on dorsal surface of stem there is a strong medial ridge against which the precoracoids abut.

Humerus fairly short (378 mm in length), but massive with greatly expanded proximal (330 mm) and distal (276? mm) ends; shaft very short, thick and broad (132 x 84 mm); deltopectoral crest very long and nearly reaches plane in

which entepicondylar foramen lies; caput broadly oval; processus lateralis lies well proximally, in same plane as caput, whereas processus medialis lies well distally; capitellum fairly massive and extends well along ventral face and nearly reaches plane of entepicondylar foramen; 'twist' on shaft fairly small (15°); lateromedial line fairly strong with muscle scars on dorsal surface of shaft; anterior dorsoventral line well developed; entepicondyle strong with ventral opening of foramen large and nearly round; ectepicondyle forms thick flange pierced by small foramen situated well away from edge of bone.

Ulna pathological but the normal condition would appear to have had a more slender shaft and weaker coronoid process than in other known species of *Jonkeria*.

Radius (length 312 mm) with flange on proximopostaxial corner weak.

Supra-acetabular part of ilium high (288 mm) and relatively short (336 mm) so that height is 87 per cent of length; anterior iliac process relatively short, but fairly high and strongly everted; posterior process short and fairly low, with posteroventral edge folded over strongly to form strong vertical ridge, which is dorsally strongly bulbous, and projects strongly laterally; on inner face of anterior iliac process no distinct facet is preserved for attachment of rib lying anterior to main sacral rib.

Femur fairly long (504 mm); fairly broad over external trochanter (264 mm), which is not separated by notch from proximal face; caput fairly thick (114 mm) and directed much preaxially; shaft broad but flat (156 x 84 mm); femorotibialis ridge fairly strong; distal facets of femur small and directed much distally, especially the entepicondyle which lies far distally.

Tibia fairly robust (length 300 mm); proximal face inclined much postaxially to correspond with the distally situated postaxial facet of femur.

Fibula fairly slender and long (330 mm). (All after Boonstra 1955*b*: 303–305, 309.)

### References

Broom 1929: 27–29, figs 15–16.

Boonstra 1955*b*: 303–305, 309, figs 90–97.

### Comments

Broom (1929) referred to this specimen as *Jonkeria* sp. and merely noted the presence of other elements.

*Parascapanodon avifontis* Boonstra, 1955

### Holotype

SAM-9127

### Material

Good precoracoid, clavicle, fibula and femur associated with parts of a large skull.

*Locality*

Voëlfontein, Prince Albert.

*Collected*

Boonstra, 1929.

*Generic diagnosis*

'The generic characters of the pectoral girdle are as described for the family [Titanosuchidae]' (Boonstra 1955*b*: 274), i.e. pectoral girdle large and massive . . . length of coracoidal plate 62–67 per cent of height. Scapula high and upper end of blade broad to very broad; scapular head of triceps attached to sharp ridge or prominent mound. Precoracoid large and massive, coracoid of medium size but massive. Clavicle large and mediolaterally flattened with expanded dorsal and ventral ends but waist not greatly constricted, ventral spatulate end curves inward to fit over outer face of upturned anterolateral corner of interclavicle; dorsal anterior end greatly thickened and produced dorsally as a short, strong process which fits into groove on lower end of cleithrum. Interclavicle large and massive, lateral horns with thickened posterolateral edges, anterior to which there is a fairly deep groove to house ventroposterior edge of spatulate end of clavicle.

Humerus very large and massive, length 575 mm and ends greatly expanded (proximal 310? mm, distal 312 mm); shaft fairly long but very robust (144 x 142 mm); deltopectoral crest long but terminates well proximal of plane in which entepicondylar foramen lies; caput very massive but short; processus medialis lies just a little distally of a plane in which caput lies, capitellum very strong and massive and extends far along ventral face but does not reach plane of entepicondylar foramen; twist on shaft large (40°); lateromedial line strong with massive swelling on dorsal surface of shaft, both epicondyles strongly developed; ventral opening of entepicondylar foramen large and broadly oval, ectepicondylar foramen small and situated well away from edge of bone.

Ulna large and massive (length 372 mm, width over coronoid process 200 mm); sigmoid face long, with ventral part broadly rounded; coronoid process situated far distally and shaft massive, broad and short.

Radius long, robust (length 294 mm) with strong proximopostaxial flange.

Femur very long and massive (length 595 mm); very broad over external trochanter (300 mm); pre-axial face deeply concave, with caput much pre-axially directed and massive (diams 215 x 167 mm); external trochanter indistinctly separated by notch from proximal face; shaft fairly long and broad (breadth 150 mm); wide over massive distal facets; area of origin of femorotibialis forms strong bulging ridge.

Tibia large and massive (length 330–355 mm); cnemial eminence very massive and continued distally as strong ridge, with deep groove lying post-axially.

Fibula large and stout (length 330–345 mm). (All after Boonstra 1955b: 266–267, 274, 276.)

*Specific diagnosis*

As for genus.

*References*

Boonstra 1955b: 266–267, 274, 276, 278, figs 63–66.

Boonstra 1962: 69, figs 10, 39A.

*Comments*

The skull is not described, illustrated or considered in the diagnosis. Boonstra (1969) considered all characters described under the names *Titanosuchus*, *Scapanodon*, and *Parascapanodon* as diagnostic of the form *Titanosuchus ferox*.

*Paratype*

SAM-9106

*Material*

Incomplete scapula, coracoid and precoracoid.

*Locality*

Veldmansrivier, Prince Albert.

*Collected*

Boonstra, 1929.

*References*

Boonstra 1955b: 278, fig. 67.

*Paratype*

SAM-9163

*Material*

Good fibula and fair ulna.

*Locality*

Wakkerstroom (part of Wolwefontein), Prince Albert.

*Collected*

Boonstra, 1929.

*References*

Boonstra 1955b: 280, fig. 70a-e.

***Paratype***

SAM-11299

***Material***

Right tibia and right radius.

***Locality***

Boesmansrivier, Beaufort West.

***Collected***

Boonstra, 1938.

***References***Boonstra 1955*b*: 281, fig. 71a-f.***Paratype***

SAM-11488

***Material***

Interclavicle, precoracoids, coracoid, right tibia, right fibula.

***Locality***

Mynhardtskraal, Beaufort West.

***Collected***

Boonstra, 1940.

***References***Boonstra 1955*b*: 278, figs 68, 69a-f.***Comments***

According to the museum catalogue, the locality is Mynhardtskraal, Beaufort West. Boonstra (1955) recorded the locality as Voëlfontein, Prince Albert. On both the tibia and fibula the number SAM-9123 has been scratched out. SAM-9123 is the paratype of *A. abeli*, a skull from Voëlfontein, Prince Albert. It would appear, therefore, that Mynhardtskraal is the correct locality.

***Paratype***

SAM-11881

***Material***

Humerus.

***Locality***

Bloukrans, Prince Albert.



*Collected*

Boonstra, 1948.

*References*

Boonstra 1955b: 284, fig. 72.

*Scapanodon duplessisi* Broom, 1904

*Holotype*

SAM-769

*Material*

Three lower jaw fragments.

*Locality*

Seekoeigat, Prince Albert.

*Collected*

Presented by Du Plessis.

*Generic diagnosis*

Two fairly large incisors, very large canine and (at least) eleven molars. Molars considerably smaller and much flatter than in *Titanosuchus*. Molars two-thirds of size of *Titanosuchus*. Section of deeper part of molar root narrow oval and becomes flatter as approaches alveolar margin. Supra-alveolar part of tooth has fair-sized root apparently devoid of enamel, with edges moderately parallel. In crown the flattening continued to even greater extent. Thickest part of crown not more than 2,0 mm thick and from centre it thins off towards edges. Tooth strengthened by being slightly concavoconvex. External surface not grooved though slightly uneven, no serrations visible at edges. Enamel very thin (about 0,15 mm). (After Broom 1904: 182-183.)

*Specific diagnosis*

As for genus.

*References*

Broom 1904: 182-183.

Broom 1923: 663.

Broom 1932: 30.

Boonstra 1953a: 25, 28.

Haughton & Brink 1955: 46.

Boonstra 1969: 35.

*Comments*

Broom (1904) described two of the fragments, which belong to the same lower jaw. The other piece, which has a single root and which may belong to

the same individual, was not described. Boonstra (1953a: 25) transferred the specimen to *Titanosuchus* but on page 28 regarded it as *incertae sedis*. Boonstra (1955a) resurrected *Scapanodon* on the basis of *S. septemfontis*. Haughton & Brink (1955: 46) retained SAM-769 in *Titanosuchus*. Boonstra (1969: 35) again regarded it as *Titanosuchus*, but considered the cranial features of this taxon to be indeterminate. He stated (1969: 35) that the humerus could not be distinguished from that of *Titanosuchus*, whilst the skull referred to this genus by Broom (1923) falls within the limits set by Boonstra for the genus *Jonkeria*.

*Scapanodon septemfontis* Boonstra, 1955

**Holotype**

SAM-5001

**Material**

Ilium, pubis, femur, humerus, ischium.

**Locality**

Sewefontein, Prince Albert.

**Collected**

Haughton, 1917.

**Generic diagnosis**

See Broom (1904) for diagnosis of *Scapanodon*.

**Specific diagnosis**

Humerus large, fairly long (480? mm); deltopectoral crest terminates far distally but still well away from ventral opening of entepicondylar foramen (after Boonstra 1955b: 271–272). Pelvis and femur as in generic diagnosis, as emended by Boonstra (1955b: 269–270). (See comments.)

**References**

Broom 1928: 431, figs 4, 5A.

Boonstra 1955b: 271–272, figs 60a, 61–62.

**Comments**

Broom (1904: 182) mentioned several other bones, including two humeri (SAM-772 and SAM-773) found in the same area as the type of *S. duplessisi* (SAM-769).

Boonstra (1955b) considered these specimens to belong to the same species as SAM-769 and based this new species (*S. septemfontis*) on the different humeral structure of SAM-5001. Boonstra (1955b) emended the generic diagnosis to include postcranial elements. Broom (1928) referred SAM-5001 to

*Tapinocephalus atherstoni*, while Boonstra (1955*b*) made it the type of a new species of *Scapanodon*, but earlier he (1953*a*) regarded *Scapanodon* (as known from Broom's *S. duplessisi*) as a junior synonym of *Titanosuchus*. Boonstra (1969), however, regarded *Scapanodon* as a junior synonym of *Titanosuchus ferox*.

*Titanosuchus cloetei* Broom, 1903

**Holotype**

SAM-731.

**Material**

Left anterior part of lower jaw.

**Locality**

Gamka River, Prince Albert.

**Collected**

Presented by Cloete.

**Generic diagnosis**

See Owen (1879) for diagnosis of *Titanosuchus*.

**Specific diagnosis**

Differentiated from *T. ferox* principally by dental measurements. Incisors in *T. cloetei* appreciably smaller, canine much smaller and rounder. In *T. cloetei* 4 molars occupy space of 40 mm, each root practically round and about 8,0 mm in diameter. Another difference is arrangement of anterior molars. In *T. ferox* the line of the molars is much on the inside of the large canine, but in *T. cloetei* a line drawn along inner sides of molars also forms a tangent to the canine. Front of jaw also very much squarer in smaller species owing to canine being relatively further forward. (After Broom 1903: 142-143.)

**References**

- Broom 1903: 142-143.
- Broom 1909*b*: 287.
- Haughton 1915*b*: 57.
- Broom 1929: 11, 25, fig. 25G.
- Broom 1932: 24, fig 6G.
- Boonstra 1953*a*: 27.
- Haughton & Brink 1955: 47.
- Boonstra 1962: 76-77, fig. 16.
- Boonstra 1969: 35.
- Kitching 1977: 36.



*Comments*

Broom (1929) transferred the specimen to *Jonkeria*. Boonstra (1953a) retained it as *Titanosuchus cloetei*. Boonstra (1969) noted that the specimen was determinable only to the family Titanosuchidae.

*Titanosuchus dubius* Haughton, 1915

*Holotype*

SAM-2759

*Material*

Right ramus of lower jaw.

*Locality*

Platfontein, Prince Albert.

*Collected*

Haughton, 1913.

*Generic diagnosis*

See Owen (1879) for diagnosis of *Titanosuchus*.

*Specific diagnosis*

Differs from *T. cloetei* in having a more massive symphysis, in being even squarer in the front of the jaw, and in the much larger canine and much smaller molars. Incisors similar in size but set much closer together. Canine narrower and longer, almost oblong in section with one side more than twice the length of the other. Molars smaller and circular in section. Line drawn along the inner side of molars just touches canine and is also tangential to inner surface of the fourth incisor. (After Haughton 1915b: 57.)

*References*

- Haughton 1915b: 57.
- Broom 1929: 33, fig. 25H.
- Broom 1932: 31, fig. 6H.
- Boonstra 1953a: 27.
- Haughton & Brink 1955: 46.
- Boonstra 1962: 77–78, fig. 17.

*Comments*

Haughton (1915b) considered *Titanosuchus* to be a therocephalian. Broom (1929) placed the species in a new genus *Dinocynodon*. Boonstra (1953a) retained it as *Titanosuchus dubius*. Boonstra (1969) stated that the poor preservation of the type made the taxon identifiable only to the family Titanosuchidae.

Family **Tapinocephalidae**

## Subfamily Tapinocephalinae

*Pelosuchus priscus* Broom, 1905***Holotype***

SAM-918

***Material***

Right dentary, partial palate, femur, tibia, coracoid, scapula, rib fragments and seven vertebrae.

***Locality***

Bokfontein, Prince Albert.

***Collected***

Du Plessis and Cairncross.

***Generic diagnosis***

Jaws differ from those of therocephalians and dinocephalians in that the teeth cannot be distinguished as incisors, canines and molars. Remains or sockets of 8 teeth present, and anterior 5 larger than posterior 3; the last 3 do not seem to have distinct sockets, but are lodged in a groove. Vertebral bodies biconcave but not deeply concave. In some the transverse processes are very large and pass upwards and outwards as in some vertebrae of *Belodon*. In others the transverse processes pass outward and downward as in pelycosaurs. Coracoid large. (After Broom 1905: 335–336.)

***Specific diagnosis***

As for genus.

***References***

- Broom 1905: 335–336.
- Broom 1932: 46, fig. 3E-G.
- Boonstra 1955b: 186, 199, 216, fig. 7.
- Haughton & Brink 1955: 48.
- Boonstra 1956: 164–165.
- Von Huene 1956: 277.
- Orlov 1964: 256.
- Boonstra 1969: 42.

***Comments***

Broom (1905) provisionally placed *Pelosuchus* as a diaptosaurian, but in 1932 recognized it as a tapinocephalian. Boonstra (1969) proposed *Pelosuchus* as a junior synonym of *Keratocephalus*.

## Subfamily Struthiocephalinae

*Struthiocephalus whaitsi* Haughton, 1915**Holotype**

SAM-2678

**Material**

Weathered skull without lower jaw.

**Locality**

Vivier Siding, Beaufort West.

**Collected**

Whaits.

**Generic diagnosis**

'Skull large; snout relatively long and slender; frontal and temporal regions not so much elevated above snout as in *Tapinocephalus*; eyes look forward and outward; heavy overhanging supraorbital crests; temporal fossae larger than orbits, elliptical in shape with shorter axis parallel to axis of skull; teeth weak, undifferentiated and few in number' (Haughton 1915a: 52).

**Specific diagnosis**

As for genus.

**References**

- Haughton 1915a: 52–54, pl. 10.  
Gregory 1926: 240, fig. 29, table 5.  
Broom 1932: 37, fig. 12C.  
Boonstra 1951: 341.  
Boonstra 1952a: figs 1–2.  
Boonstra 1952b: 511.  
Boonstra 1952d: 248.  
Boonstra 1953b: 32, 46–47, 49–51.  
Haughton & Brink 1955: 48–49.  
Boonstra 1965b: 251.

**Comments**

Boonstra (1953b) provided emended generic and specific diagnoses of this taxon. Haughton & Brink's (1955) generic diagnosis differs from that given originally by Haughton (1915a). Boonstra (1969) recognized this species as the only valid species of *Struthiocephalus*.

*Struthiocephalus akraalensis* Boonstra, 1952**Holotype**

SAM-3719

*Material*

Good skull without lower jaw.

*Locality*

Abrahamskraal, Prince Albert.

*Collected*

Haughton.

*Generic diagnosis*

See Haughton (1915) for diagnosis of *Struthiocephalus*.

*Specific diagnosis*

Compared mainly to *S. whaitsi*, dorsal surface of parietal wider and not pinched in but frontal narrower and dorsally excavated; postfrontal and postorbital have larger dorsal exposure and squamosal forms a greater part of post-temporal arch, which is also of considerably stronger build. Much larger than any of the other described species. Pineal foramen lies further forward; median occipital ridge narrow and sharp and dorsal portion not broadened; postorbital bar forms at its junction with dorsal skull surface a strong ridge parallel to the mid-line and medial to this the surface of frontal and parietal hollowed out; the surface of the postorbital skull bones is coarse with deep rugae and crocodile-like pits. (After Boonstra 1952*d*: 247–248.)

*References*

- Boonstra 1952*d*: 247–248, figs 1–2.
- Boonstra 1952*f*: 238.
- Boonstra 1953*b*: 32, 50.
- Haughton & Brink 1955: 49.
- Boonstra 1969: 39.

*Comments*

With regard to the material, the museum catalogue states 'skull and skeleton', but there are no associated postcrania in the collection and nor are any referred to in any of Boonstra's papers. Boonstra (1953*b*) provided an emended specific diagnosis and later (Boonstra 1969) proposed *S. akraalensis* as a junior synonym of *S. whaitsi*.

*Struthiocephaloides cavifrons* Boonstra, 1952

*Holotype*

SAM-5607

*Material*

Skull and scapula.

*Locality*

Lammerkraal, Prince Albert.

*Collected*

Haughton, 1916.

*Generic diagnosis*

Mormosaurid with skull similar to *Struthiocephalus*, but without nasofrontal boss and without interorbital postrostral step; moderately wide across the postorbitals; in dorsal view the postorbitals do not form lateral border of skull (after Boonstra 1952f: 237, 240).

*Specific diagnosis*

'Large; snout fairly high and strong; interorbital part of skull roof concave; distinct parietal boss; skull widest at level of postorbital arches; pineal foramen lies far back' (Boonstra 1952f: 241).

*References*

- Boonstra 1952f: 237–241, figs 1–3.
- Boonstra 1953b: 48.
- Boonstra 1955b: 236, fig. 29a–b.
- Haughton & Brink 1955: 49.
- Boonstra 1969: 39, 55.

*Comments*

Boonstra (1969) maintained that this was a valid taxon.

*Struthiocephaloides duplessisi* Boonstra, 1952

*Holotype*

SAM-11693

*Material*

Good skull.

*Locality*

Dikbome, Laingsburg.

*Collected*

Boonstra, 1946.

*Generic diagnosis*

See Boonstra (1952f) for diagnosis of *Struthiocephaloides*.

*Specific diagnosis*

[Skull] small; snout low and weak; interorbital skull roof convex; parietal boss not distinct; maximum width in region of temporal fossae; pineal foramen situated far anteriorly' (Boonstra 1952f: 241).

*References*

- Boonstra 1952b: 509–511, figs 1–2.  
Boonstra 1952f: 238, 241.  
Boonstra 1954b: 32, 45.  
Haughton & Brink 1955: 49.  
Boonstra 1969: 39, 55.

*Comments*

Boonstra (1952b) made this specimen the type of *Struthiocephalus duplessisi* sp. nov., and later (1952f) transferred the species to his new genus *Struthiocephaloides*. Boonstra (1969) considered *Struthiocephaloides duplessisi* to be a valid taxon.

*Struthionops intermedius* Boonstra, 1952

*Holotype*

SAM-11947

*Material*

Distorted and somewhat weathered skull without lower jaw.

*Locality*

See comments.

*Collected*

Unknown.

*Generic diagnosis*

Skull fairly lightly built with slight pachyostosis; postorbital arch moderately strong, with no boss-like swelling of its upper part; posterodorsal circumorbital bones only slightly thickened with little overhanging of orbits; frontals excluded from orbital border; nasals and frontals only slightly thickened with very slight indication of a nasofrontal swelling; in sagittal plane the middle part of nasals forms concave dorsal surface and at nasofrontal junction surface moderately convex; pineal foramen penetrates small but prominent boss directed somewhat posteriorly; snout fairly long, wide and fairly high; temporal fossa medium-sized with dorsoventral diameter much greater than anteroposterior diameter; orbits large; interorbital width large; intertemporal width fairly large; intertemporal region laterally only slightly pinched in and without any indication of parietal crest; occiput inclined much anteriorly dorsoventrally; quadrates apparently only moderately shifted forward; probably



14–15 teeth in upper jaw; large frontals and prefrontals; parietals small; large pineal foramen situated near occipital border; postorbital apparently just meets squamosal, but parietal forms upper edge of temporal fossa (after Boonstra 1952c: 988–989).

*Specific diagnosis*

As for genus.

*References*

- Boonstra 1952c: 988–989, figs 1–2.  
Boonstra 1952h: 246.  
Boonstra 1953b: 48–50, 52–53.  
Haughton & Brink 1955: 50.  
Von Huene 1956: 277.  
Piveteau 1961b: 277.  
Boonstra 1963a: 178.  
Boonstra 1963b: 202, 204, figs 3J, 4K.  
Orlov 1964: 258.  
Boonstra 1969: 41, fig. 10K.

*Comments*

While in the museum catalogue the locality is stated to be unknown, Boonstra (1952c) stated that it was probably recovered in the vicinity of Abrahamskraal, Prince Albert. Boonstra (1952c) originally placed this taxon in the Mormosauridae, a view which Orlov (1964) also supported. Boonstra (1953b) emended the diagnosis of this taxon. He (1969) considered this to be a valid taxon.

*Struthiocephalellus parvus* Boonstra, 1955

***Holotype***

SAM-5006

*Material*

Skull, scapula, humerus, ulna, pelvis, femur, proximal portion of tibia, vertebrae, and several small, unidentified fragments.

*Locality*

See comments.

*Collected*

Haughton, 1916–17.

*Generic diagnosis*

Skull about half size of *Struthiocephalus whaitsi*. Weak pachyostosis with postorbital bar relatively slender and post temporal opening roomy; occiput

fairly upright and quadrate not shifted very far anteriorly; snout moderately high; no frontonasal boss. Posterior tooth crowns spatulate in outline and labiolingually compressed. In one or two of the rear crowns there appears to have been a stronger central cusp with a weaker posterior and anterior cusp as in *Agnosaurus* and *Rhopalodon*.

Cervical vertebrae similar to *Moschops* and *Moschognathus* and to those of the synapsids generally. ProAtlas stout. Atlas temnospondylus with paired neural arch lying on large atlantal intercentrum and odontoid-like pleurocentrum. Atlantal intercentrum large with facet for capitulum of atlantal rib. Axial neural arch halves fused to each other and to pleurocentrum to form holospondylous vertebra. Spine comb-shaped. Axial centrum laterally excavated below diapophysis with sharp ventral keel. Third intercentrum smaller than its predecessors. Third cervical vertebra deeply excavated below diapophysis so that ventrally it shows a sharp keel. Atlantal rib greatly flattened, small bone with weak shaft, greatly expanded leaf-like tuberculum and much weaker capitulum. (After Boonstra 1955a: 180–184.)

#### *Specific diagnosis*

As for genus.

#### *References*

- Boonstra 1955a: 180–184, figs 1–3.  
 Boonstra 1955b: 203, 225, 237–238, figs 27c, 29c, 30–33.  
 Von Huene 1956: 277.  
 Piveteau 1961b: 277.  
 Orlov 1964: 258.

#### *Comments*

The locality, according to the museum catalogue, is Wilgebosch-Drift, Beaufort West. Boonstra (1955a, 1955b) gave it as Abrahamskraal, Prince Albert.

Orlov (1964) placed this taxon into the Mormosauridae. Boonstra (1969) proposed to synonymize it with *Struthiocephalus* and recognized this specimen as a juvenile of *S. whaitsi*. Boonstra (1969) considered the material assigned to *S. parvus* to represent juvenile specimens of *Struthiocephalus whaitsi*. The legend to fig. 27c in Boonstra (1955b) erroneously reads *Struthiocephalus* instead of *Struthiocephalellus*.

#### Subfamily Riebeeckosaurinae

#### *Riebeeckosaurus longirostris* Boonstra, 1952

#### *Holotype*

SAM-3400



*Material*

Incomplete skull with part of lower jaw, vertebrae and several associated, unidentified bone fragments.

*Locality*

Near Vivier Siding, Beaufort West.

*Collected*

Whaits, 1915.

*Generic diagnosis*

'Tapinocephalid with large skull, long and quite narrow; snout long, narrow and quite high; cranial bones quite thickened; postorbital arch very massive; temporal fossa roomy with dorsoventral diameter much greater than anteroposterior diameter; intertemporal area very narrow and forms sagittal crest which curves downwards and backwards; parietal forms part of supratemporal edge; occiput very inclined; parietal very small; frontal large, does not form part of supraorbital border, but reaches supratemporal border; prefrontal forms supraorbital border; quadrate supported by anteriorly directed process of quadratojugal; teeth undifferentiated' (Boonstra 1952*h*: 248).

*Specific diagnosis*

As for genus.

*References*

- Boonstra 1952*h*: 246–249, figs 1–3.  
Haughton & Brink 1955: 53.  
Von Huene 1956: 277.  
Piveteau 1961*b*: 275.  
Boonstra 1963*a*: 178.  
Boonstra 1963*b*: 200, 205, figs 3E, 4F, 6F.  
Orlov 1964: 258.  
Boonstra 1969: 42, fig. 13.  
Boonstra 1971: 21, 33.

*Comments*

Boonstra (1963) placed this taxon in the subfamily Riebeeckosaurinae and in 1969 he placed that subfamily within the family Tapinocephalidae. Haughton & Brink (1955) proposed that the taxon be placed in the family Moschopidae, while Orlov (1964) considered it to represent the family Mormosauridae. Boonstra (1969) considered it to be a valid taxon.

## Subfamily Moschopinae

*Delphinognathus conocephalus* Seeley, 1892*Holotype*

SAM-713

*Material*

Incomplete, weathered skull with part of lower jaw.

*Locality*

Doubtful—perhaps near Beaufort West, according to Seeley (1892).

*Collected*

?Bain, 1883.

*Generic diagnosis*

Broad, high and vertical occipital plate; large pineal foramen in middle of prominent boss (cone) with foramen at level of posterior border of orbit; orbits placed far back; quadratosquamosal region directed obliquely forward; lower jaw short and singularly deep posteriorly; occipital plate higher than wide; temporal fossa relatively small; prefrontal region concave; sub-ovate notch in inferior margin of posterior margin of posterior part of temporal arch (after Seeley 1892: 469–475).

*Specific diagnosis*

As for genus.

*References*

- Seeley 1892: 469–475, figs 1–2.  
Broom 1910: 206, fig. 4.  
Broom 1914: 135–136.  
Gregory 1926: 228–230, 249, fig. 22a, tables II, III, IV.  
Broom 1932: 44–45, fig. 9K.  
Boonstra 1936: 93.  
Haughton & Brink 1955: 51.  
Von Huene 1956: 277.  
Boonstra 1957: 15–17, 19–21, 27, 29, 33, 36–37, fig. 10.  
Boonstra 1963a: 178.  
Boonstra 1963b: 202, 205, figs 3F, 4G.  
Orlov 1964: 258.  
Boonstra 1969: 42, 55, fig. 11c.  
Tatarinov 1976: 46.

*Comments*

Seeley's (1892) diagnosis of this taxon was emended by Broom (1932), Haughton & Brink (1955) and Boonstra (1957). Gregory (1926) placed the

taxon in the subfamily Moschopinae, while Boonstra (1936) and Orlov (1964) were prepared only to place it in the family Moschopidae. Boonstra (1963) placed it in the family Tapinocephalidae and in 1969 proposed that the specimen be regarded as a juvenile of *Moschops*. Tatarinov (1976) placed the taxon in the family Delphinognathidae.

*Moschosaurus longiceps* Haughton, 1915

***Holotype***

SAM-3015

***Material***

Good but weathered skull and six vertebrae.

***Locality***

La-de-da, Beaufort West.

***Collected***

Haughton, 1914.

***Generic diagnosis***

Skull long, low and narrow; parietal region slightly elevated but not tremendously thickened; nares rather far back; orbits in posterior half of skull and larger than temporal openings; quadrate in plane of middle of orbit; lower jaw massive; premaxillary teeth large with long anterior and smaller posterior cusps; postorbital bar comparatively weak; postorbital bone forms large part of upper border of temporal fossa; pineal foramen large and placed very far back (after Haughton 1915c: 78–81).

***Specific diagnosis***

As for genus.

***References***

- Haughton 1915c: 78–81, figs 8–9.
- Broom 1923: 663.
- Gregory 1926: 227, 241, fig. 21, table V.
- Broom 1932: 45, fig. 12D.
- Boonstra 1936: 93–95, 97.
- Boonstra 1952g: 243–244.
- Haughton & Brink 1955: 52–53.
- Von Huene 1956: 276, fig. 317.
- Boonstra 1955a: 183.
- Piveteau 1961b: 277.
- Boonstra 1963a: 178, 188.

Boonstra 1963*b*: 199–200, figs 2D, 3D, 4E.

Orlov 1964: 258, fig. 216.

Boonstra 1965*b*: 265, fig. 11.

Boonstra 1969: 39, fig. 10E.

### *Comments*

Haughton (1915) considered this taxon to be titanosuchid, and Broom (1923) regarded the specimen as an immature titanosuchid. Gregory (1926) considered the taxon referable to the family Tapinocephalidae and erected the subfamily Moschosaurinae to accommodate it. Broom (1932) agreed that it represents a tapinocephalid as did Boonstra (1936), who erected Gregory's subfamily to familial rank, viz, Moschosauridae, and also emended the diagnosis of the taxon *Moschosaurus longiceps*. In 1963, however, Boonstra (1963*b*) changed the rank of the family Moschosauridae back to subfamilial status. Boonstra (1965*b*) proposed to synonymize the taxon with *Struthiocephalus*, a view that he maintained later (Boonstra 1969).

*Agnosaurus pienaari* Boonstra, 1952

### *Holotype*

SAM-11832

### *Material*

Weathered, incomplete skull.

### *Locality*

Lammerkraal, Prince Albert.

### *Collected*

Presented by Pienaar.

### *Generic diagnosis*

'*Moschosaurus*-like Tapinocephalid [*sic*] with slight pachyostosis; large temporal fossa; snout quite long, high and narrow; quadrate shifted forward moderately; anterior teeth typical tapinocephaloid but posterior teeth with spatulate crowns and cylindrical roots' (Boonstra 1952*g*: 245).

### *Specific diagnosis*

As for genus.

### *References*

Boonstra 1952*g*: 242–245, fig. 1.

Boonstra 1953*b*: 52.

Haughton & Brink 1955: 52.

- Boonstra 1955a: 182–183.  
Von Huene 1956: 277.  
Piveteau 1961b: 277.  
Boonstra 1963a: 178.  
Orlov 1964: 258.  
Boonstra 1969: 42.

### *Comments*

Orlov (1964) placed this taxon in the family Moschosauridae. Boonstra (1969) regarded *A. pienaar* as a junior synonym of *Moschops*.

*Avenantia kruisvleiensis* Boonstra, 1952

### *Holotype*

SAM-9166

### *Material*

Nearly complete skull, proximal part of femur, two vertebrae, ?fibula and two unidentified fragments. See comments.

### *Locality*

Kruisvlei, Beaufort West.

### *Collected*

Boonstra, 1929.

### *Generic diagnosis*

'Moschopid-like Tapinocephalid [sic], but exoccipital forms part of condyle, narrow intertemporal region, low parietal crest, postorbital meets squamosal in temporal fossa, pineal foramen surrounded by a distinct ridge' (Boonstra 1952i: 225).

### *Specific diagnosis*

As for genus.

### *References*

- Boonstra 1952h: 248.  
Boonstra 1952i: 250–255, figs 1–3.  
Haughton & Brink 1955: 50.  
Boonstra 1955b: 258.  
Von Huene 1956: 276.  
Boonstra 1957: 16–22, 24–28, 33, 35–37, fig. 11.  
Boonstra 1963a: 178.  
Boonstra 1963b: 202, 205, figs. 3G, 4H.

- Orlov 1964: 258.  
 Boonstra 1969: 42, 55.  
 Boonstra 1971: 21, 33.

*Comments*

There is some doubt regarding the postcranial material labelled SAM-9166. Specimens SAM-9166 and SAM-9167 are from the same locality, and Boonstra (1952*i*) noted that SAM-9166 is one of a 'wagon-load of specimens found partially weathered out in a small area'. The museum catalogue entry for SAM-9166 notes only 'skull'; the entry for SAM-9167 notes 'ilium, femur, fibula, vertebrae'. Boonstra (1955*b*) mistakenly referred to SAM-9167 as the type of *Avenantia kruisvleiensis*, and recorded it as having scapula, ilium, femur, and skull. The museum catalogue entry for SAM-9167, however, does not refer to a skull. It appears that the postcranial material labelled SAM-9166 may belong instead to SAM-9167.

Boonstra (1957) provided an emended diagnosis for this taxon. Orlov (1964) referred it to the family Moschopidae and Boonstra (1969) referred it to the subfamily Moschopinae as a valid taxon.

Boonstra (1952*h*) referred to *Avenantia kruisvleiensis* in an article which preceded the paper (Boonstra 1952*i*) in which the type description of the taxon was given. Accordingly, Boonstra's (1952*h*) use of the name *Avenantia kruisvleiensis* made it a *nomen nudum*. However, *Avenantia kruisvleiensis* was made available in his second paper (Boonstra 1952*i*).

*Moschops koupensis* Boonstra, 1957

*Holotype*

SAM-11582

*Material*

Good skull with part of lower jaw.

*Locality*

Die Krans, Prince Albert.

*Collected*

Boonstra and Bothma, 1940.

*Generic diagnosis*

See Broom (1911) for diagnosis of *Moschops*.

*Specific diagnosis*

'[Skull] very wide across parietals with interorbital width 70 per cent of intertemporal width. Snout relatively narrow. Occipital surface greatly reduced by overgrowth from above and from the sides. Transverse pterygoidal rami are strong.' (Boonstra 1957: 32-33.)



*References*

- Boonstra 1957: 18–19, 21–26, 32–33, figs 5–9.  
Boonstra 1969: 42.

*Comments*

Boonstra (1969) considered this specimen to represent a valid species of *Moschops*.

**Family Styraucocephalidae**

*Styraucocephalus platyrhynchus* Haughton, 1929

*Holotype*

SAM-8936

*Material*

Incomplete, crushed and badly weathered skull and part of lower jaw.

*Locality*

Boesmansrivier, Beaufort West.

*Collected*

Boonstra, 1928.

*Generic diagnosis*

Most striking features are large backwardly projecting tabular horns, massiveness of bones in postorbital region, small temporal opening, swollen cheek-like quadratojugal, and shallowness of snout which is also fairly long and narrow. Pineal foramen small and situated in middle of low, broad swelling in middle of parietal surface. Teeth present on pterygoids and palatines. (After Haughton 1929: 55–57.)

*Specific diagnosis*

As for genus.

*References*

- Haughton 1929: 55–60, figs 3–5.  
Broom 1932: 139, fig. 47A.  
Boonstra 1934: 465, 467–470.  
Romer 1945: 601.  
Haughton & Brink 1955: 54.  
Von Huene 1956: 287–288.  
Heyler 1961: 127.  
Boonstra 1963a: 176–178, 188, figs 2L, 3J, 4H, 12.

- Boonstra 1963*b*: 196, 199, 206, figs 1, 2, 3C, 4D, 5G, 6G.  
 Orlov 1964: 267.  
 Romer 1966: 372.  
 Boonstra 1969: 44, fig. 14.  
 Boonstra 1971: 18, 22, 24–26, 33–34, 40, 42, fig. 3.  
 Boonstra 1972: 316, 321, 325–326, fig. 2.  
 Tatarinov 1974: 51–52.  
 Kitching 1977: 33.

### *Comments*

Haughton (1929) referred this taxon to a new suborder, Styracocephalia. Broom (1932) placed it into another suborder, Burnetiamorpha, and considered that the specimen's affinities were with the Gorgonopsia rather than with the Dinocephalia. Boonstra (1934) regarded the specimen as a dinocephalian and maintained it in Haughton's Styracocephalia. Romer (1945) followed Broom, however, placing the taxon in the Gorgonopsia and in the family Burnetiidae (=Burnetiamorpha of Broom). Haughton & Brink (1955) followed Boonstra (1934) and placed it in the Dinocephalia, using Haughton's subordinal classification of Styracocephalia. Heyler (1961) followed Romer (1945), however, and placed it in the gorgonopsian family Burnetiidae. Von Huene (1956: 287) considered this taxon to belong to the Dinocephalia, but placed it into the 'Familienkreis u. Familie Burnetiamorpha'. Boonstra (1963*a*) still considered it to be a dinocephalian and proposed the new family rank, Styracocephalidae for its placement. Orlov (1964) regarded it as belonging to the Burnetidae [*sic*] of the Gorgonopsoidea, and Romer (1966) re-affirmed his earlier (1945) conviction of its taxonomic placement. Boonstra (1969, 1971) proposed to maintain it in the family Styracocephalidae, which he regarded in 1972 as belonging to the Titanosuchia. Tatarinov (1974) considered that the taxon should be placed in the Burnetiidae of the order 'Gorgonopia', whilst Kitching (1977) maintained that *Styracocephalus* is a tapinocephalid and should be placed in the subfamily Tapinocephalinae.

### ACKNOWLEDGEMENTS

We wish to thank Dr M.A. Cluver for reading and constructively criticizing this paper, and Mrs E. Blaeske and Mrs P. Eedes for typing the manuscript.

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